3011

HORNET'S NEST

MARINE AIR GROUP 31

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Randy Jolly

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by Randy Jolly

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INTRODUCTION

"Fightertown East," now located in Beaufort, South Carolina, is the home of Marine Air Group 31 (MAG-31) which has existed since 1943. Currently the largest Marine Strike Fighter Base on the east coast, it is comprised of seven squadrons of F/A-18 Hornets which provide the bulk of firepower to the Second Marine Aircraft Wing (2d MAW). The history of the MAG has emulated the proud history of the Marine Corps in every detail from its very inception.

Marine Air Group 31 was commissioned at Cherry Point, North Carolina on February 1, 1943. From October 2, 1943 until October 12, 1945, the Group operated throughout the Pacific area and played an important role in the Battle for Okinawa. Subsequent to the seizure of Okinawa, MAG-31 squadrons continued their part in the war by conducting operations from Yantan Airfield on the island. While at Okinawa, MAG-31 was commanded by Colonel John C. Munn, who later would become a Lieutenant General and Assistant Commandant of the Marine Corps.

On October 12, 1945, the Group departed Okinawa for Yokosuka, Japan, becoming the first Marine land based Group to operate in the Japanese homeland. The Group was transferred from the 2d MAW to the 4th MAW on February 12, 1946, and then to the Aircraft, Fleet Marine Force Pacific on March 13, 1946.

The Group returned to the United States on July 5, 1946, and was stationed at the Marine Corps Air Station Miramar, San Diego, California until it was decommissioned on May 31, 1947.

MAG-31 was reactivated on March 17, 1952 at Cherry Point, North Carolina and transferred to Marine Corps Air Station Miami, Florida, operating as a part of the 3d MAW until it was again decommissioned in 1958.

On November 1, 1961, MAG-31 was again reactivated and stationed at its present home, Marine Corps Air Station Beaufort, South Carolina, as part of the 2d MAW.

The mission of MAG-31 is to conduct anti-air warfare and offensive support operations in support of Fleet Marine Force from advance bases, expeditionary airfields, and aircraft carriers, and to conduct such other air operations as they may be directed. It meets these missions utilizing the assets assigned to the MAG which are comprised of two squadrons of F/A-18As, two squadrons of F/A-18Cs and three squadrons of F/A-18Ds. Each squadron is assigned 12 aircraft and approximately 17 aircrews and 145 Marines.

At any moment in time, MAG-31 has the assets spread all over the globe in response to world conflicts that United States intervention is required in order to enforce and preserve the peace. Currently, they are involved with the operations in Bosnia, peace keeping in Korea and protecting US citizens in Albania. They do this while operating out of Aviano Air Base, Italy, Iwakuni, Japan and off the steel decks of aircraft carriers.

Marine Air Group 31 has won numerous awards during its proud and illustrious history and it will continue to do so and remain at the forefront of Marine Aviation.

Note:

Special thanks to: Colonel Jim Amos, LtCol. J.A. Papay, Jr., Captain Curly Lambrecht and Captain John Sherrell.

VMFA-115

Squadron patch of VMFA-115 "Silver Eagles".

As a crew chief looks on, a section (two aircraft) of Marine Corps Air Station (MCAS) Beaufort F/A-18As of VMFA-115 prepare to taxi during a Combined Armed Exercise (CAX) at Camp Wilson located at 29 Palms, California.

On the ramp at the expeditionary airfield Camp Wilson, 29 Palms, California, VMFA-115 F/A-18As are parked along with F/A-18Ds of VMFA(AW)-533 during a CAX. The austere conditions, metal planking of the flightline and runway, and the vast high desert simulate real world conditions.

Mission complete, a VMFA-115 pilot leaves his aircraft in the good hands of the crew chief. Note the evidence of heavy gun use on the nose of the aircraft. At Combined Arms Exercises pilots have the opportunity to deliver live ordnance and make extensive use of the 20mm cannon mounted in the nose.

An interesting, albeit light, load for a VMFA-115 F/A-18A. Of particular note is the "live" Mk 77 fire bomb under the right wing and a Mk 82 500-lb. bomb under the left wing. The small blue bombs (Mk 76s) mounted on the multiple ejector rack (MER) are used to simulate dropping heavy ordnance without actually carrying the more expensive live ordnance. The 25-lb. blue bomb simulate the ballistics of a Mk 80 series bomb, and has a smoke charge which explodes upon impact with the ground. As with any weapon, the pilot enters a code into the aircraft's computer, and the appropriate parameters for delivering the ordnance are displayed to the pilot in the Heads Up Display (HUD) once the target is designated. Through a combination of radar ranging and inputs from the air data computer, the effects of wind and aircraft motion are taken into account in order to achieve pinpoint accuracy.

With gear down and locked and flaps down, a VMFA-115 Hornet turns on final at the expeditionary airfield at Camp Wilson, 29 Palms, California.

Two VMFA-115 F/A-18As down low only a few hundred feet off the ground heading to the target area.

Aerial refueling play is an important role in the success of long-range combat operations. As a result, Marine F/A-18 pilots train with different types of tanker aircraft. In the Marine Corps, the tanking duties are performed exclusively by KC-130s. Shown is a KC-130 from VMGR-252 from Marine Corps Air Station Cherry Point, North Carolina, refueling two F/A-18As from VMFA-115. This procedure is difficult enough in the daytime due to the turbulence encountered at low altitudes. Add in the factor of lights out, nighttime refueling or in poor weather and the task becomes increasingly difficult.

As the crew chief makes a final walk around of the aircraft prior to launch, a VMFA-115 pilot waits in the chocks, with engines running, in preparation for a Close Air Support (CAS) training mission.

The skipper's aircraft, "01" has the Commander's name emblazoned on the fuselage just below the canopy. Clearly seen is the targeting FLIR pod located on the left side of the aircraft. The F/A-18 can laser designate its own targets in delivering Laser Guided Bombs (LGBs), resulting in deadly precision.

VMFA-122

Squadron patch of VMFA-122 "Crusaders".

Following a test flight on a VMFA-122 F/A-18A, the pilot heads back to the squadron while the crew chief reinstalls pins to the ejection seat and to ready the cockpit for the next pilot.

As a VMFA-122 pilot climbs aboard his aircraft, crew chiefs prepare the aircraft for engine start. The boot covers over the pilot's flight boots are put on as the pilot gets ready to board. They ensure that rocks and other foreign objects don't get transferred to the cockpit.

Insignia of the VMFA-122 "Crusaders".

Going vertical, a VMFA-122 F/A-18A shows off a typical "air-to-mud" load: AGM-65 Maverick, Mk 82 500-lb. bomb under the right wing and Mk 82, HARM missile under the left wing. Even in the air-to-ground mode, the Hornet typically carries two AIM-9 Sidewinders for air to air work.

A VMFA-122 F/A-18A taxies at Marine Corps Air Station Yuma. VMFA-122 and its sister squadron VMFA-115 are the only "A" model equipped Hornet squadrons on the East Coast.

New markings on the Beaufort based Hornets includes the "BM" at the top of the rudder to indicate the aircraft is, indeed, from MCAS Beaufort.

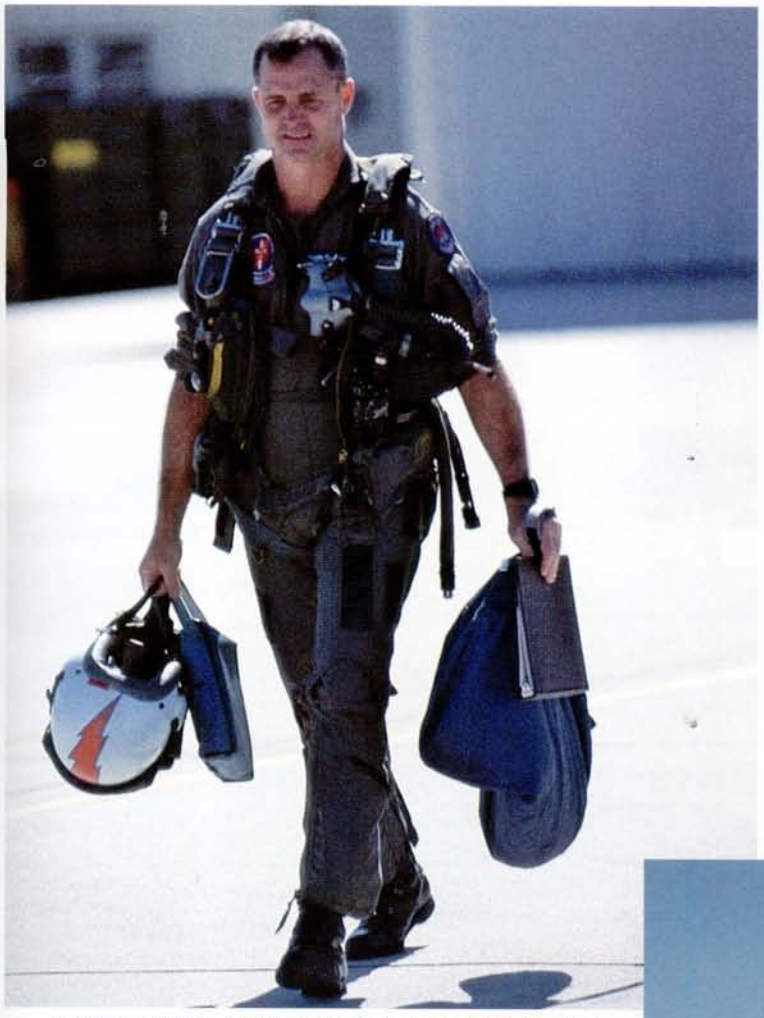
A VMFA-122 F/A-18A being loaded with four Mk 82 500-lb. bombs. The yellow stripe on the ordnance indicates it is a live round. Shown during a CAX visit, this F/A-18A was preparing for a Close Air Support sortie during the final "battle" at the conclusion of the exercise.

Taking off "clean," a VMFA-122 "Crusader" retracts its landing gear shortly after take-off from Camp Wilson at 29 Palms, California.

Three F/A-18D Night Strike Hornets of VMFA(AW)-224 and a single F/A-18A of VMFA-122 head back to Camp Wilson after a bombing run in support of Marines on the ground at 29 Palms, California.

A section of F/A-18A's, one configured in the air-to-ground role (foreground) and the other in a light air-to-air configuration (background) spiral to altitude above MCAS Beaufort. The F/A-18 can be employed as its own self escort. Essentially, the F/A-18 is a fighter on a mission. Just outside the target area, with a push of one button, the pilot can transition to the bombing role and accurately deliver ordnance. Usually before they have finished pulling out of the dive on the bombing run, they have transitioned back to fighter by switching to the air-to-air Master Mode.

VMFA-251



A pilot from VMFA-251 "Thunderbolt" walks to his aircraft at MCAS Beaufort, South Carolina in preparation for a carrier qualification flight. The Block 16 F/A-18Cs of the squadron augment Carrier Air Wing One and on their most recent cruise were aboard the USS America. Note the standard flight gear for Marine F/A-18 pilots: helmet (with white reflective tape), oxygen mask and OBOGS regulator, survival gear and G-suit.

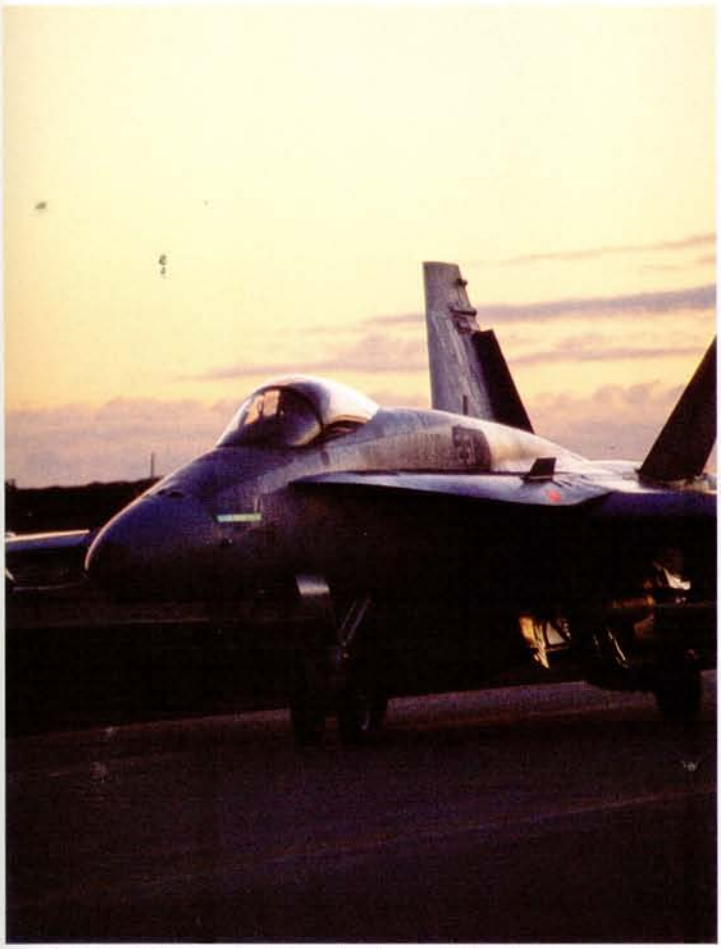
Squadron patch of VMFA-251 "Thunderbolts".

With all systems "go," the pilot taxies out of the chocks at MCAS Beaufort to head for the carrier stationed off the North Carolina coast. The crew chief snaps the customary salute to the pilot.

Prior to taxi, a final check of the speed brake, flaps, tail hook, refueling probe and all the surfaces are given a final inspection to make sure everything is functional.

An F/A-18C of VMFA-251 configured with two Multiple Ejector Racks (MERs), one under each wing, plus two captive AIM-9s on the wingtip mounts and a centerline fuel tank.

An F/A-18C of VMFA-251 configured for the "boat" with three external fuel tanks, a MER under each wing and wingtip mounted AIM-9s. The F/A-18 is somewhat fuel limited at the boat. Because each section/division must stay airborne for a set amount of time before recovering on deck, pilots must be conservative with their fuel, which shortens the amount of time spent on tactical flying.



A VMFA-251 "Thunderbolt" taxies for a twilight takeoff and a nighttime sortie. All VMFA-251 pilots are NVG qualified. Obviously, being able to "see in the dark" is a huge advantage. This advantage is primarily in the air-to-ground environment, in low level night navigation and air-to-ground target identification. Night air-to-air is also enhanced by allowing more flexible formations and in gaining sight of an adversary much earlier.

The clean lines of the F/A-18 are evident in this photo. However, to go into harm's way in the air-to-ground role, the jet could be configured in any number of ways to employ nearly all conventional air-to-ground munitions including: HARM, Laser and IR Maverick, Walleye, Datalink-Walleye, conventional and Laser Guided Bombs, SLAM, Zuni and 2.75" rockets, cluster munitions, anti-shipping mines and the anti-ship Harpoon missile as well as a nose full of bullets.

In the air-to-air mode, VMFA-251 aircraft would normally carry two AIM-9s and two AIM-120 AMRAAMs plus fuel tanks.

Whether at Beaufort or on cruise with the Carrier Air Wing, VMFA-251 pilots train for either air-to-air or air-to-ground engagements. Over 50% of the training is air-to-air, roughly 40% air-to-ground and the remaining 10% for carrier operations. The squadron conducts individual, section, division and strike training in air-to-air and air-to-ground sorties. In the air-to-air mode, the squadron trains with the AIM-9, AIM-7, and AIM-120 as well as air-to-air radar and FLIR using standard joint air-to-air tactics.

A section of VMFA-251 F/A-18s leaving Beaufort heading for the carrier stationed off shore the North Carolina coast.

Refueling a flight of "Thunderbolts" on a cross country flight is a KC-130 from VMGR-234 stationed at Carswell Joint Reserve Base, Fort Worth, Texas. Shown here is a high speed refueling evolution at 20,000 feet. The KC-130 is an extremely capable refueling platform. However, the refueling baskets trailing behind the outboard external fuel tanks have to be especially configured for either high speed (and high altitude) or low level work.

Shown carrying only wingtip mounted AIM-9s, this F/A-18C of VMFA-251 would normally be configured with two AIM-9s and two AIM-120s or two AIM-7s. The squadron has completely switched to AMRAAM, regarding tactics, but retain the AIM-7 capability because it does have some advantages. They train with both.

VMFA-312

Squadron patch for the world famous "Checkerboards" of VMFA-312.

The F/A-18 patch specially designed to include the "Checkerboards" motif.

Configured in the air-to-ground mode, this "Checkerboard" F/A-18C (foreground) sports AIM-9s on the wingtip stations, an AGM-65 Maverick under the right wing, a navigation forward looking infrared sensor (NAVFLIR) on the right "cheek" mount, a centerline fuel tank, a targeting FLIR mounted on the left side of the fuselage, and a HARM missile mounted under the left wing. This loadout is ideal for the SEAD mission (suppression of enemy air defenses). If the enemy's radars are turned and emitting, the HARM could kill them. If the enemy turns his radars off to avoid being killed by the HARM and the radar site can visually acquired and laser designated, the Maverick would be used to kill it.

As F/A-18s of VMFA-312 taxi to the chocks they conduct a "hot seat" procedure when the jets have to be quickly turned and launched in the minimum amount of time. The "hot seat" procedure saves the maintenance folks about 45 minutes to an hour in turnaround maintenance. Whenever a jet is shut down there is certain preventative maintenance that must be done on it prior to its next flight. If the jet is not shut down then the time consuming maintenance doesn't have to be performed. To work around this, the pilot who just finished flying takes the jet through the fuel pits and gases up just like at a gas station. The oncoming pilot then walks around the jet to ensure there are no discrepancies with the airplane that he does not wish to fly with, gives a thumbs up to the pilot sitting in the cockpit and he shuts down the left engine. This helps to prevent fod (foreign object damage) from being sucked down the intake during the crew switch. The new pilot starts the right motor and is ready to go. It saves a tremendous amount of maintenance time and gives the pilots the opportunity to achieve their ultimate goal — spend more time flying.

The beauty of the F/A-18, aside from its purely clean and pleasing aerodynamic lines, is that it can fight its way into and out of a target area. The aircraft in the foreground carries an air-to-ground load (actually a SEAD loadout) and the aircraft in the background is configured in the air-to-air role with two AIM-9s and two AIM-7s.

An F/A-18C of VMFA-312 aboard the Nimitz class carrier USS Theodore Roosevelt (CVN-71). The F/A-18 is going through some preflight preparations as it is parked at the bottom of the one row which is just forward the crunch bowl. This is on the starboard side of catapult number one. The only time an aircraft traps and then is taxied directly to the catapult is when carrier qualifications (CQ) are conducted. Normally, the pilots start up and then taxi to the catapult and are launched. After the last aircraft is launched, the airplanes from the cycle before are waiting overhead to recover. Once they are onboard, they are taxied and shut down where they are and prepared for the next cycle. A cycle is normally an hour and a half.

Evidence of spending time on the carrier, the "dirty" undersides of a VMFA-312 jet show the effects of launching and recovering on the deck. The NAVFLIR is visible on the right and the targeting FLIR is visible on the left — mounted on the fuselage. Just inboard of the FLIR pods are flare dispensers. Imagery from the NAVFLIR is projected on the pilot's Head Up Display (HUD) and combined with navigation and weapon delivery symbology. The targeting FLIR is fully integrated for air-to-ground targeting and air-to-air target identification. A laser target designator and ranger, integral to the FLIR pod, allows autonomous laser-guided weapon delivery.

With its tail hook down, a VMFA-312 Hornet cruises high above the USS Theodore Roosevelt ("TR" for short).

Showing off its three "bags" of gas, a VMFA-312 "Checkerboard" pilot waits his turn to recover aboard the TR.

The latest edition of the Checkerboards' paint scheme.

In the old-style paint markings, a VMFA-312 delivers live ordnance over the Barry Goldwater Range near Yuma, Arizona during a Weapons and Tactics Instructor (WTI) course. The pilot "pops" and rolls inverted to visually acquire the target and continues the roll until the aircraft is again wings level but in a dive with the nose aimed at the target. Based on ballistics parameters in the aircraft's computer, the bombs come off (in this case high drag bombs) at the precise moment that will ensure a direct hit.

VMFA-451

Squadron patch of VMFA-451. What the enemy in three wars was unable to do, the downsizing of America's armed forces accomplished in January, 1997 - the decommissioning of one of the Marine Corps' top squadrons, VMFA-451. With a proud heritage stretching back over 50 years, the squadron known as the Warlords boasts an impressive record of accomplishments while flying practically everything the Marines have flown over the years from the Corsair to the Hornet.

A beautiful day and a young F/A-18 pilot's fancy turns to thoughts of AIR-TO-AIR! Shown here is the Commander's mount decked out for Combat Air Patrol with two AIM-7 and two AIM-9.

Climbing out over MCAS Beaufort, two VMFA-451 Hornets fly close formation. The aircraft in the foreground is configured for air-to-ground with two Mk 83 1,000-lb. bombs under the right wing and a single AGM-65 Maverick missile under the left. For self defense it also carries two AIM-9s. In the background, flying lead, is the skipper's aircraft configured for air-to-air with two AIM-7s and two AIM-9s.

"Warlord" pilot strapping into his F/A-18A. Marines are the most tactically oriented bunch of pilots you'll find. Example: the camouflaged cloth cover on the helmet. Cuts down on reflections in the canopy, improving visual look-out and if the pilot has to "punch out" it will keep him hidden better than the white "bone dome." However, when the Marines go to the boat, they dispense with the camo cover in preference for the white, reflective tape-covered helmet in the event they have to bail out over the water where search and rescue efforts are aided by white helmets.

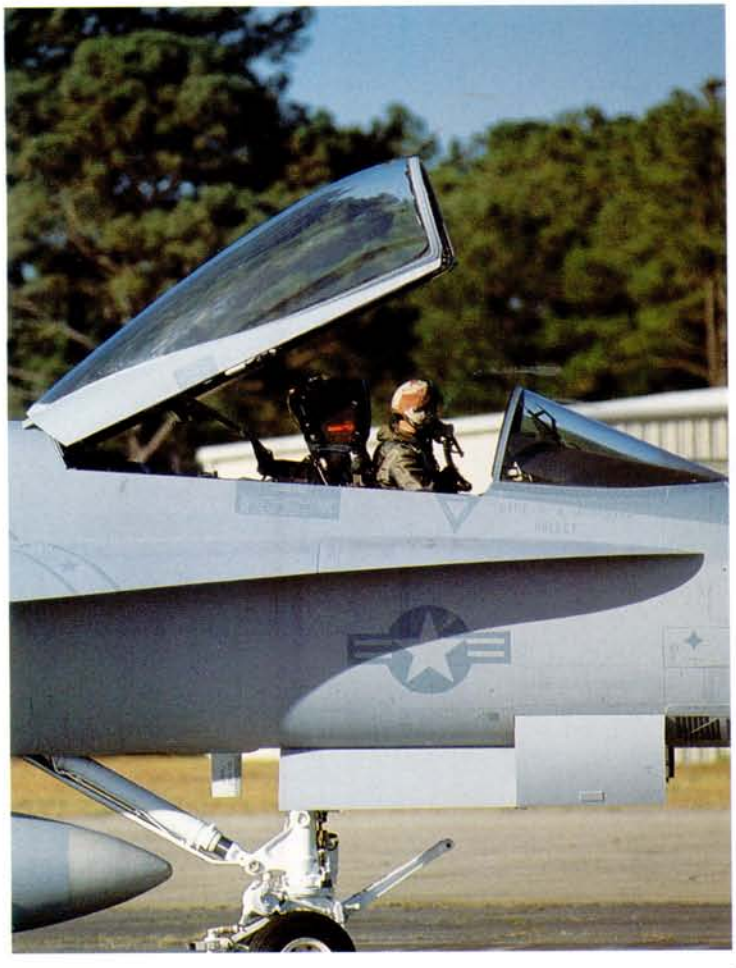
It doesn't get any better than this. A virtually cloudless sky and an F/A-18 to fly. Pilots share the feelings their predecessors felt flying through the same sky in all the Warlord's airplanes: F4U, F6F, F9F, FJ-2, F8U and F-4. Current regulations allow for one jet in the squadron to receive a set of full-color markings - usually the squadron commander's airplane. Here it's flying with a more standard painted aircraft showing off the low visibility paint scheme.

Close-up of the Commander's aircraft.

Everything's out or hanging for the crew chief to check for leaks. This check is accomplished after starting the Hornet's two engines.

Maintenance is everything. If the Marines on the ground don't do their job then the aviators can't do theirs. A clean canopy is a must and one Marine polishes off the canopy to prepare the jet for an air-to-ground training sortie.

As the crew chief stands by, a VMFA-451 pilot climbs the ladder to the cockpit.



Air refueling behind a KC-130 is a tricky bit of flying, especially down low in the turbulence. The pilot has to gingerly engage the undulating basket extended from the outboard fuel tank on the KC-130 or risk breaking off his refueling probe.

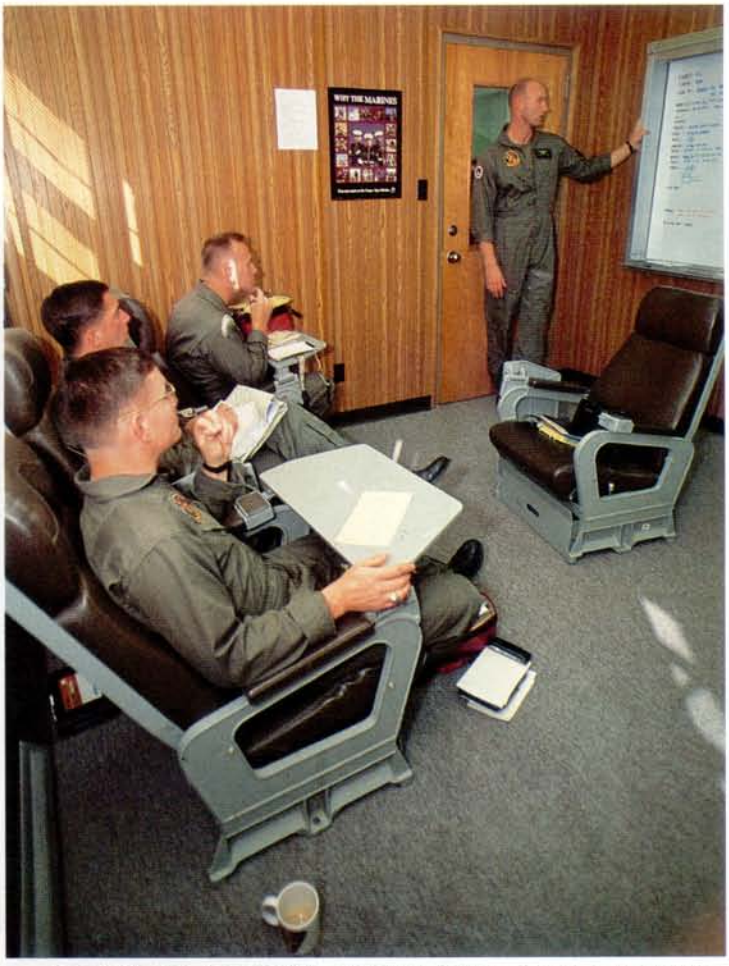
Final checks complete, chocks pulled, a Warlord pilot taxies out to launch on a training sortie.

VMFA(AW)-224

Squadron patch of VMFA(AW)-224, the "Bengals".

A VMFA(AW)-224 Night Strike Hornet makes a low pass over the Hornet's Nest, Marine Corps Air Station Beaufort, South Carolina.

The Commander's aircraft sporting the new "tiger stripes". Except for the Commander's aircraft, all the other jets in squadron have black stripes against a gray background.



Every mission, in peacetime or in war, is preceded by a lengthy and detailed briefing. Administrative details, such as call signs, radio frequencies, fuel consumption and a myriad other details are discussed as well as the specifics of the mission itself. Here a VMFA(AW)-224 pilot briefs his Weapons Systems Officer (WSO) and the pilot and WSO in the other aircraft.

After the brief, the pilot and WSO walk around their aircraft making sure there are no anomalies and that the jet is ready to go.

A Hornet pilot, obviously with lots of flight time in the F/A-18 checks six.

The WSO actually sits up higher than the pilot in the F/A-18D thus affording both crew members outstanding visibility.

The view from the backseat is spectacular. While the F/A-18D has enhanced performance engines, upgraded radar and Night Vision Goggle (NVG) compatible cockpits, the big difference is the two-man crew. Earlier two-seat Hornets were really single-seat airplanes, mission-wise. The F/A-18D is built around the two-man team that drastically decreases individual workload while increasing overall situational awareness. The pilot flies the aircraft, employs the weapons and assists in operating the sensors. The WSO is the primary operator of the sensors, radar and FLIR. The pilot can focus more of his attention on flying the aircraft to weapons release while the WSO is working the systems to find and designate the target. Two brains, four eyes and two bags of situational awareness can be a lifesaver.

With Night Vision Goggles, the F/A-18D owns the night. The NVGs allow the crew to fly into any target area with lights out at low level in a tactical formation - as opposed to a trail formation - and just about eliminate the shoulder-fired SAM threat. Target acquisition with NVGs is much easier than with the FLIR alone due to the field of view. Air-to-air, the NVGs allow the crew to make positive identifications at night.

Two pilots, a WSO and a crew chief confer prior to the launch of two aircraft on a bomb training sortie.

Teamwork is everything. Here an F/A-18D crew; pilot (right) and WSO (left). Crew coordination is essential to a successful mission and gives the F/A-18D an advantage over other strike aircraft.

A VMFA(AW)-224 pilot patiently awaits the crew chief's signal that everything has been checked and is in good condition prior to taxiing out the chocks and launching on a twilight sortie. His aircraft is loaded with eight Mk 82 500-lb. bombs..

A view of one side of the ramp with VMFA(AW)-224 Hornets at MCAS Beaufort, South Carolina. In the background, a Navy SH-60 taxies by.

Power to spare. A VMFA(AW)-224 F/A-18D shows with what ease it can climb vertical with its enhanced performance F404-GE400 engines rate at 16,000 pounds of thrust with afterburner. It has a speed in excess of 1,100 mph and a service ceiling of 50,000 feet. What does all this power mean? Speed, in combat, means survivability. Going supersonic at low altitude makes an anti-aircraft gunner's job a nightmare. High-speed performance makes the jet that much more effective in getting to and from the target and spending a very little amount of time over target.

In the early morning sky an F/A-18D from VMFA(AW)-224 is configured in the air-to-air role; two AIM-9s and two AIM-7s.

A section of Bengals showing off their new tiger stripes and the wide assortment of ordnance that can be carried by the F/A-18D. This two ship flight of F/A-18Ds could easily be tasked with Close Air Support, Offensive Counter Air, Forward Air Controller (Airborne), Suppression of Enemy Air Defenses and Combat Search and Rescue. The aircraft in the foreground is carrying four Mk 83 1,000-lb. bombs, two AIM-9s and two AIM-7s. The aircraft in the background is configured with two AIM-9s and four AIM-7s.

Carrying five Mk 82 500-lb. bombs a VMFA(AW)-224 "Bengal" pitches away to begin its approach to the target.

Down low and really, really fast. A Bengal jet racing along below the peaks of the nearby mountains. Terrain is great protection for a jet trying to sneak past enemy air defenses. The F/A-18D performs this task to perfection any time of the day or night or in poor weather.

Too much fuel on the way home means the jet has to vent some to get down to an acceptable landing weight.

The perfect strike package. The F/A-18D in the foreground is carrying a load of Mk 82 500-lb. bombs while his wingman is carrying HARM missiles to "put out the eyes" of enemy radar.

Configured for the SEAD role (suppression of enemy air defenses) this VMFA(AW)-224 "Bengal" is carrying two AIM-9s, two AIM-7s and two AGM-88 HARMs. The HARM is an air-to-surface tactical missile designed to seek out and destroy enemy radar-equipped air defense systems. It is a fire and forget weapon. The proportional guidance system that homes in on enemy radar emissions has a fixed antenna and seeker head in the missile's nose.

Close to home. A VMFA(AW)-224 jet banks over the coast near its home Marine Corps Air Station Beaufort, South Carolina.

Without its AIM-9s it's a sure bet this F/A-18D is flying a peacetime training sortie. Live ordnance, in this case Mk 82 500-lb. bombs, is being hauled to the target. The F/A-18D is an extremely accurate bomber. Even non-precision guided ordnance can be put precisely on target due to the comprehensive weapons computer onboard which, coupled with the GPS factors ballistics, the aircraft's position and even takes into consideration the rotation of the earth at the point of impact.

Showing off its weapons carrying capabilities, a VMFA(AW)-224 F/A-18D is all "bombed up" awaiting its crew. Shown here are two Cluster Munitions under the wing and a Mk 82 500-lb. bomb mounted on the centerline station. Barely visible under the right wing are two more Mk 82s.

Marines load four-shot, 5" Zuni rocket pods to a VMFA(AW)-224 aircraft during a Combined Arms Exercise at 29 Palms, California.

A VMFA(AW)-224 F/A-18D lifts off with an asymmetrical loadout. Under the left wing is a single 5" Zuni rocket pod and under the right wing are two Zuni rocket pods.

The Hornet is one of the most maneuverable aircraft in the world and its ability to "point its nose" at an adversary is a well respected fact. Just ask any F-16 or F-15 who has had to go up against the Hornet in an air-to-air engagement.

Four AIM-7s, two AIM-9s and a nose full of bullets makes this F/A-18D a potent air-to-air platform.

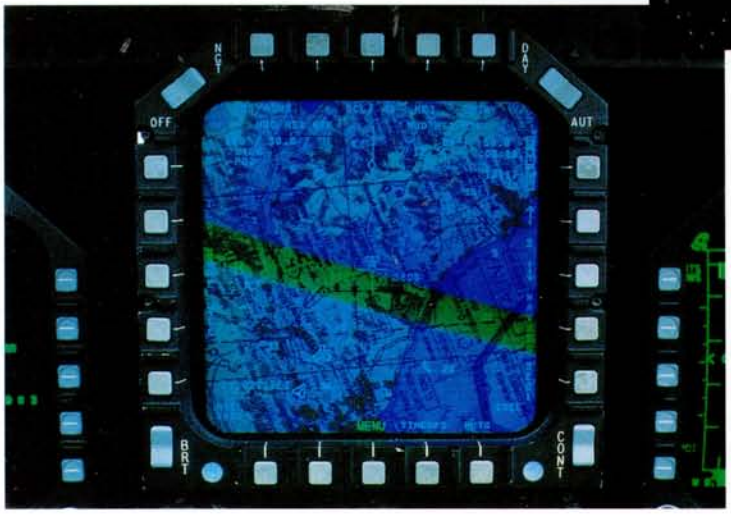
An F/A-18D of VMFA(AW)-224 heads for the target range carrying a load of five Mk 82 500-lb. bombs plus 578 rounds of 20mm. The ingress to the target area calls for low level tactics (LAT) training. An exciting experience in daytime, down low, lights out at night is an environment well suited for the Night Strike Hornet. Note the all-gray ordnance. Though some olive drab-painted weapons remain in the inventory more recent arrivals are all gray. Yellow stripes on the bombs indicate live ordnance.

A section of VMFA(AW)-224 jets train as they intend to fight. The lead aircraft is carrying an air-to-ground loadout of Mk 82 bombs while his wingman is carrying two HARM missiles to fulfill the SEAD role.

"Blue death" as the Mk 76 are facetiously called, simulate the ballistics of the Mk 80 series of bombs. Ordnance technicians are shown loading six Mk 76 on MERs for a total of 12 carried on this particular training sortie. Consider that on each pass over the target, the pilot "pops" by pointing the nose of the aircraft to the sky, rolls inverted to visually acquire the target, pushes the nose down toward the earth, rolls wings level into about a 60 degree dive, releases one Mk 76 and recovers from the dive hard right or left pulling five or six Gs. Imagine going through this scenario 12 times! It's a long day at the office. However, it is excellent training for F/A-18D crews and is one of the reasons they are so proficient at their work.

The "swing-role," the ability to accomplish several tasks on a single mission, is ideally suited to the F/A-18D. The VMFA(AW)-224 aircraft pitching out is configured in an air-to-air loadout with two AIM-9s and four AIM-7s. In a combat scenario this loadout would likely be augmented with AIM-120 AMRAAMs as well. The aircraft in the foreground is configured with two AIM-9s, two Mk 83 1,000-lb. bombs, one AGM-88 HARM and one AGM-65 Maverick. In addition, both aircraft employ the 20mm cannon.

The backseat layout of the F/A-18D. The front "office" incorporates multi-function displays (MFDs) that overlay color symbols on monochrome sensor presentations. Two of these displays straddle the Up Front Control (UFC) below the HUD. Below the UFC is a third full-color display of a digital moving map. The back cockpit is entirely new. The stick and throttle have been taken out, two side-stick displays and weapons controllers have been put in and three MFDs occupy most of the "instrument" panel. These are identical to the ones in the front cockpit and have the full-color display between the two color/monochrome displays. In both cockpits, only four true instruments remain; these have been shrunk to half size and perform only backup roles. Because all the displays are independent, situation awareness is improved. The pilot see and control everything the WSO can. This allows task to be shared, resulting in greater combat effectiveness.



The moving map display in the F/A-18D gives the crew real-time on their location, heading and all other navigational data.

A VMFA(AW)-224 releasing a Walleye. (Photo by J.A. Papay)

Wings, flaps and tail hook down, a VMFA(AW)-224 "Bengal" turns on final at MCAS Beaufort.

VMFA(AW)-332

Squadron patch of the VMFA(AW)-332 "Moonlighters".

A Moonlighter jet showing off its air-to-ground loadout of two Mk 82 500-lb. bombs, AGM-65 Maverick and AGM-88 HARM plus two AIM-9s for self defense.

The VMFA(AW)-332 aircraft in the foreground is configured with two AGM-65 Mavericks, two AIM-9s and two underwing fuel tanks while the aircraft in the background is configured with two AIM-9s, two Mk 82 500-lb. bombs, an AGM-65 Maverick and an AGM-88 HARM.

Though the blue paint indicates "inert" or training ordnance, this "Moonlighter" F/A-18D shows the wide assortment of munitions that can be carried on a single mission.

As twilight fades to darkness, an F/A-18D crew prepares to do what the Hornet does best - strike at night. With the APG-73 radar, the Night Strike Hornet can radar bomb through the clouds with unimpeded precision.

In an uncharacteristically shallow dive, a VMFA(AW)-332 F/A-18D releases a pair of Mk 82 500-lb. bombs.

A section of Moonlighters. Between them, they are carrying four AIM-9s, three AGM-65 Mavericks, one AGM-88 HARM, two Mk 82 500-lb. bombs and 1,156 rounds of 20mm.

Hidden behind the clean lines of this VMFA(AW)-332 is the powerful APG-73 radar. The APG-73 is a vast improvement over the APG-65 of earlier F/A-18s. The APG-73's radar data processors, power supply, units and receiver/exciter were upgraded to improve capability and reliability with no increase in weight or size. The range is up 7 to 20 percent, the resolution has been increased, the processing speed has been increased nearly tenfold and the mean time between failures has doubled. The radar has 10 air-to-air and 12 air-to-ground modes. These include "track while scan," which allows up to ten targets to be tracked simultaneously while supporting multi-role AIM-120 AMRAAM launches. The increase resolution improves ground map capability; this is all important when poor weather demands that the target be radar bombed.

VMFA(AW)-533

Squadron patch of VMFA(AW)-533 "Hawks."

An exceptionally light loadout for this "Hawk" includes an AGM-65 Maverick and a 2.75" rocket pod. Note the NAVFLIR and the targeting FLIR mounted on the fuselage.

An F/A-18D of VMFA(AW)-533 ripple fires 2.75" rockets. The 2.75" can carry a multitude of different warheads from high explosive to white phosphorous, or "willie pete" or "WP" for short. The WP round is used to mark targets in the FAC(A) role (forward air controller - airborne).

Up close and personal. A VMFA(AW)-533 "Hawk" on patrol in the skies over Bosnia. The yellow bands on the AIM-9 and the AGM-88 HARM indicate live rounds. (Photo by J.A. Papay)

A VMFA(AW)-533 F/A-18D begins its bombing run configured with four Mk 82 500-lb. bombs.

Two VMFA(AW)-533 "Hawks" climbing away from the expeditionary airfield at 29 Palms, California. The aircraft in the foreground is configured with two 2.75" rocket packs under the right wing and an AGM-65 Maverick under the left wing. The aircraft in the background is configured with four Mk 83 1,000-lb. bombs.

A VMFA(AW)-533 fires an AGM-65 Maverick. The WSO finds the target on the FLIR and designates it at some point. This slews all the aircraft's sensors to the target. The pilot arms up the system (laser) and puts the jet in the release parameters. Once the system tells the pilot that upon release the Maverick will see the laser energy (either from the jet or from a laser source on the ground), the pilot pickles the Maverick and keeps the jet in a position to illuminate the target with laser energy. The WSO monitors the FLIR to make sure it is looking at the right target and keeps it there until impact. The laser guided Maverick is a nice standoff weapon. (Photo by J.A. Papay)

In the "swing-role" the F/A-18D is unequaled. The "Hawk" shown here is configured with two AIM-9s, and GBU-16 (1,000-lb. laser guided bomb) under the left wing, an AGM-88 HARM under the right wing, two 330 gallon (US) wing tanks and the AN/AAS-38A targeting FLIR. (Photo by J.A. Papay)

The F/A-18D's ability to carry not huge amounts of ordnance but huge ordnance is evidenced in this photo of a VMFA(AW)-533 aircraft toting a Walleye and the Datalink pod associated with the weapon. As one aircrew described the Walleye "It's like carrying an A-4 Skyhawk under your wing!" (Photo by J.A. Papay)

A VMFA(W)-533 aircraft drops Mk 83 1,000-lb. bombs. For non-precision munitions, a wide variety of delivery modes are available. The aircrew may choose a low altitude ingress to avoid being spotted by enemy radar. The crew may use man made and natural terrain features to help navigate to the target. When approaching the target, the aircraft will perform a "pop" maneuver, increasing altitude in order to allow the aircrew to visually acquire the target. The pilot will then roll inverted and pull the aircraft's nose to the target, rolling upright once again to deliver the ordnance from a variety of altitudes and dive angles. Shown here is a 60 degree dive (although from the backseat it appears almost vertical - 90 degrees).

A pair of "Hawks" refuel behind a KC-130 from VMGR-252.

"Hot pit" refueling is standard procedure. As the crew taxies to the flight line after recovering, they park in the fuel pits where, with engines running, all of the fuel tanks are filled. Once the process is complete, the pilot taxies back to the chocks and shuts down the engines. The next crew comes aboard and proceeds with their flight since the aircraft is already full of fuel.

Formation flying at its best, VMFA(AW)-533 F/A-18Ds show off for the camera. (Photo by J.A. Papay)

Somewhere over the Italian Alps, a VMFA(AW)-533 shows off its latest paint scheme during the 1997 deployment to Aviano Air Base, Italy in support of the operations over Bosnia. (Photo by J.A. Papay)

A "Hawk" F/A-18D poses over the nuclear power plant located on the coast of California between Santa Ana and San Diego. (Photo by J.A. Papay)

Having expended all its ordnance, a VMFA(AW)-533 crew heads for home. (Photo by J.A. Papay)

MAG-31 in Combined Armed Exercise (CAX)

The objectives of the CAX are to exercise and evaluate active and Reserve Fleet Marine Force units and Marine Air Ground Task Forces (MAGTFs) in command, control and coordination of combined arms within a maneuver warfare, live-fire environment.

The specific goals of each CAX differ only in how they are applied to the various participants. In some exercises, the Navy participates by contributing F-14s. The primary goal, however, is to solidify in the Ground Combat Element (GCE) and the Air Combat Element (ACE), a purpose and a point of reference for Marines on the closely integrated efforts of the MAGTF.

Since the CAX is the most realistic live-fire training opportunity in the Marine Corps, it is designed to provide commanders the experience of employing all weapons systems of the MAGTF in support of the Marines on the ground. About 2,500 Marines and sailors participate in each 22-day event which used the "building block" approach, starting with small unit training and culminating with a three-day final exercise.

MAG-31 is not stranger to CAX. Every year different squadrons deploy to Camp Wilson, the expeditionary airfield located in the high desert of 29 Palms, California. Aircrews live in tents and maintenance and support personnel live in "A" frame structures in the austere conditions similar to the ones they would endure in the real world somewhere half way around the world. It is an intense time of heightened operations tempo with flying conducted almost around the clock. It's a great time for aviators as they get to fly lots of hours and drop live ordnance.

5" Zuni rocket pods are loaded onto a VMFA(AW)-224 F/A-18D.

As maintenance troops take a breather, a VMFA(AW)-224 aircrew lowers its canopy and prepares to taxi. It is rare to see a jet "clean" as this aircraft is as most sorties flown out of Camp Wilson are to deliver live ordnance.

A Marine carts a load of three Mk 82 500-lb. bombs to an awaiting aircraft.

Maintenance complete, an enlisted Marine watches as an F/A-18D crew starts engines and goes through their pre-flight checks.

A VMFA(AW)-533 pilot exudes the quiet confidence of knowing he is one of the best trained aviators in the world.

As another F/A-18 launches in the background, maintenance and ordnance crews ready a VMFA(AW)-224 aircraft for a Close Air Support sortie. Note the two 5" Zuni rocket pods loaded under the right wing.

Prior to boarding their aircraft, the flight crew walks around the jet to check for any discrepancies. This VMFA(AW)-224 F/A-18D is configured with three Mk 82 500-lb. bombs; one under each wing and another mounted on the centerline station.

With chocks pulled and all systems go, the crew chief snaps a smart salute to the crew of a VMFA(AW)-224 Night Strike Hornet.

The Navy's VF-84 sent their F-14s to participate in CAX 4/95. While an undisputed air superiority platform, the Tomcat tried its hand at delivering Mk 83 1,000-lb. bombs in Close Air Support scenarios.

A VMFA(AW)-224 "Bengal" lifts off the aluminum-plank runway at Camp Wilson.

A "Bengal" crew from VMFA(AW)-224 flies only a few hundred feet off the deck on their way to the target.

The Hornet is equipped with the M61A-1 20mm cannon capable of firing up to 6,000 rounds per minute in either the air-to-air or air-to-ground mode. The Hornet carries up to 578 high explosive (HE) rounds that explode on impact. In air-to-ground mode, the pilot can select the gun either as a stand alone weapon or he can fire the gun and drop bombs simultaneously. From the cockpit, the pilot can actually see the rounds streaming toward the target. In the air-to-air mode, the M61A-1 is without question one of the finest air-to-air guns in the world. The F/A-18s radar and on board computers use target aircraft position, range and velocity to present a highly accurate gun solution to the pilot on the HUD. The pilot can then maneuver the aircraft to place the gun reticle on his opponent and deliver the Hornet's deadly sting.

Following a successful Close Air Support mission, a VMFA(AW)-533 aircraft taxies back to the parking area.

Three F/A-18Ds of VMFA(AW)-224 and a single F/A-18A of VMFA-122 pitch out and head for home after a series of bombing and strafing attacks.

Dropping its centerline mounted Mk 82 500-lb. bomb, a VMFA(AW)-224 F/A-18D will quickly climb out of the way to avoid being hit by fragments of its own bomb.

An F/A-18D crew from VMFA(AW)-533 patiently awaits the fuel pit crew as the aircraft is refueled following their flight and before they taxi back to the chocks.

VMFA(AW)-224 aircraft #504 hauling five Mk 82 five hundred pound bombs to the target from medium and low altitude during a live fire sortie at 29 Palms.

Maintenance is a key element to the success of any Marine aircraft getting to and from its target. Maintenance troops ready a VMFA-122 F/A-18A for a bombing mission as evidenced by the MERs mounted under the wings.

A VMFA(AW)-533 "Hawk" unleashes a laser-guided Maverick. The crew may choose to use an altitude sanctuary to avoid being exposed to small arms, anti-aircraft artillery (AAA) and shoulder fired missiles. As the F/A-18 approaches the target on the radar from as far away as 40 nautical miles, the FLIR may be used to more accurately designate the target. Finally, the aircrew will illuminate the target with laser energy, allowing the munitions to guide to the target until impact.

Hornets over Bosnia

There are three "D" squadrons at MCAS Beaufort. They rotate out of Aviano, Italy every six months, giving a 11-12 month turnaround. They fly Lot 15, 16, and 17 F/A-18Ds. Originally designated *Operation Decisive Edge* the operations over Bosnia have been redesignated *Decisive Endeavor, Deliberate Force, Deny Flight, Provide Promise* and, most recently, *Deliberate Guard*. Regardless of the name of the operation, the F/A-18 plays a significant role in the skies over Bosnia. The F/A-18D, in particular, has earned the respect of everyone involved for its unique "swing role" capabilities.

The "swing role" means that the aircraft are armed and ready to carry out Close Air Support, Offensive Counter Air, Forward Air Controller (Airborne), Suppression of Enemy Air Defenses and Combat Search and Rescue at any time. Once in country, the Night Strike Hornets can be tasked with any mission.

A VMFA(AW)-533 "Hawk" with the new logo on the tail which superimposes the squadron's hawk symbol over the silhouette of Italy.

A VMFA(AW)-224 "Bengal" about to launch on a sortie out of Aviano for Bosnia.

In the swing role performed by the F/A-18D, a two ship section carries enough ordnance to handle the various missions it may be called upon to perform. This photo shows a typical configuration for flight lead of a two ship section flying over Bosnia:

- Station 1 - AIM-9M
- Station 2 - GBU-16 (1,000-lb. bomb)
- Station 3 - 330 gallon wingtank
- Station 4 - Targeting FLIR (AN/AAS-38A)
- Station 5 - Clean centerline (this allows a larger field of view for the FLIR when used in the air-to-ground/laser usage)
- Station 6 - LST (laser spot tracker); allows the WSO to acquire a laser spot being generated by someone else on the ground or in the air lasing the target for the aircraft
- Station 7 - 330 gallon wingtank
- Station 8 - 5" Zuni rockets with WP (white phosphorous used to mark targets for Close Air Support)
- Station 9 - AIM-9M
- 550 rounds of 20mm

The typical configuration for the wingman in the two-ship section flying over Bosnia:

- Station 1 - AIM-9M
- Station 2 - GBU-16 LGB (1,000-lb. bomb)
- Station 3 - 330 gallon wingtank
- Station 4 - Targeting FLIR
- Station 5 - clean centerline or fuel tank
- Station 6 - AIM-120 AMRAAM
- Station 7 - 330 gallon wingtank
- Station 8 - AGM-88 HARM
- Station 9 - AIM-9M
- 550 rounds of 20mm

A VMFA(AW)-533 "Hawk" releases a flare to decoy any IR guided SAMs. Numerous SAMs have been launched at the F/A-18s — but to no avail.

A VMFA(AW)-224 "Bengal" configured for the Close Air Support role with one Mk 82 500-lb. bomb mounted on centerline, an AGM-65 Maverick mounted on station two, a GBU-16 LGB mounted on station eight. For air-to-air work, the Hornet carries two AIM-9Ms on stations one and nine and an AIM-7 on station six.

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With its APG-73 radar, the F/A-18D can bomb through the overcast. Shown here is a VMFA(AW)-533 "Hawk" in the skies over Bosnia.

The coast of Italy and the Italian Alps make a perfect backdrop to one of the most elegant — and lethal — airplanes ever built, the F/A-18D.

Returning from a sortie over Bosnia, a VMFA(AW)-533 F/A-18D turns on final over the Italian countryside.

Aerial refueling is key player in the flights over Bosnia. The versatility to tank behind a number of aircraft from different nationalities is shown:

A US Air Force KC-135 refuels an F/A-18D from VMFA(AW)-533 on a twilight sortie.

A Spanish C-130 provides fuel for a VMFA(AW)-533 Night Strike Hornet.

With the daylight almost gone, a British KC-135 provides tanker assistance to a VMFA(AW)-533 "Hawk".

As an F-14 refuels behind a KC-135R, a VMFA(AW)-224 aircraft waits its turn to refuel.

A section of F/A-18Ds from VMFA(AW)-224 takes on gas from a US Air Force KC-10.

A VMFA(AW)-224 on its way to patrol over the Bosnian skies. The loadout includes the two Mk 82 500-lb. bombs shown but also, hidden from the camera, is the deadly mix of air-to-air missiles and either an LGB-16 or a HARM or Maverick missile.

War may be hell...but flying through the Alps on a clear day is pure heaven! The VMFA(AW)-533 "Hawk" crew makes it look simple though flying through the mountains like this, even on a clear day, is a bumpy ride to say the least.

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